

Human Computer Interaction

CS449 – CS549

Psychology of HCI-1

KÜRSAT ÇAĞILTAY

General 



URL

Assignment-5 and 6 groups - Term Project Groups and Topic Form 

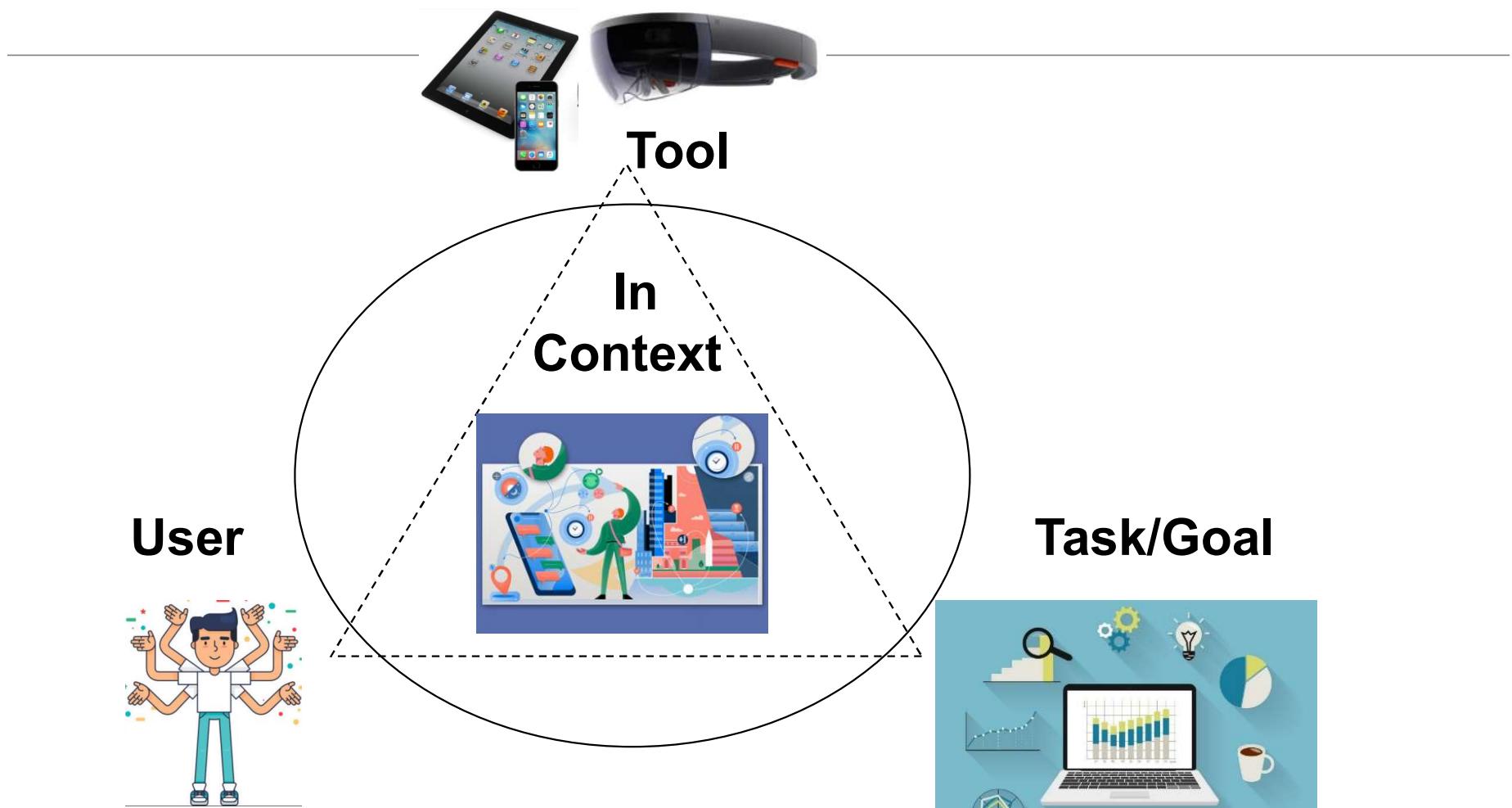


ASSIGNMENT

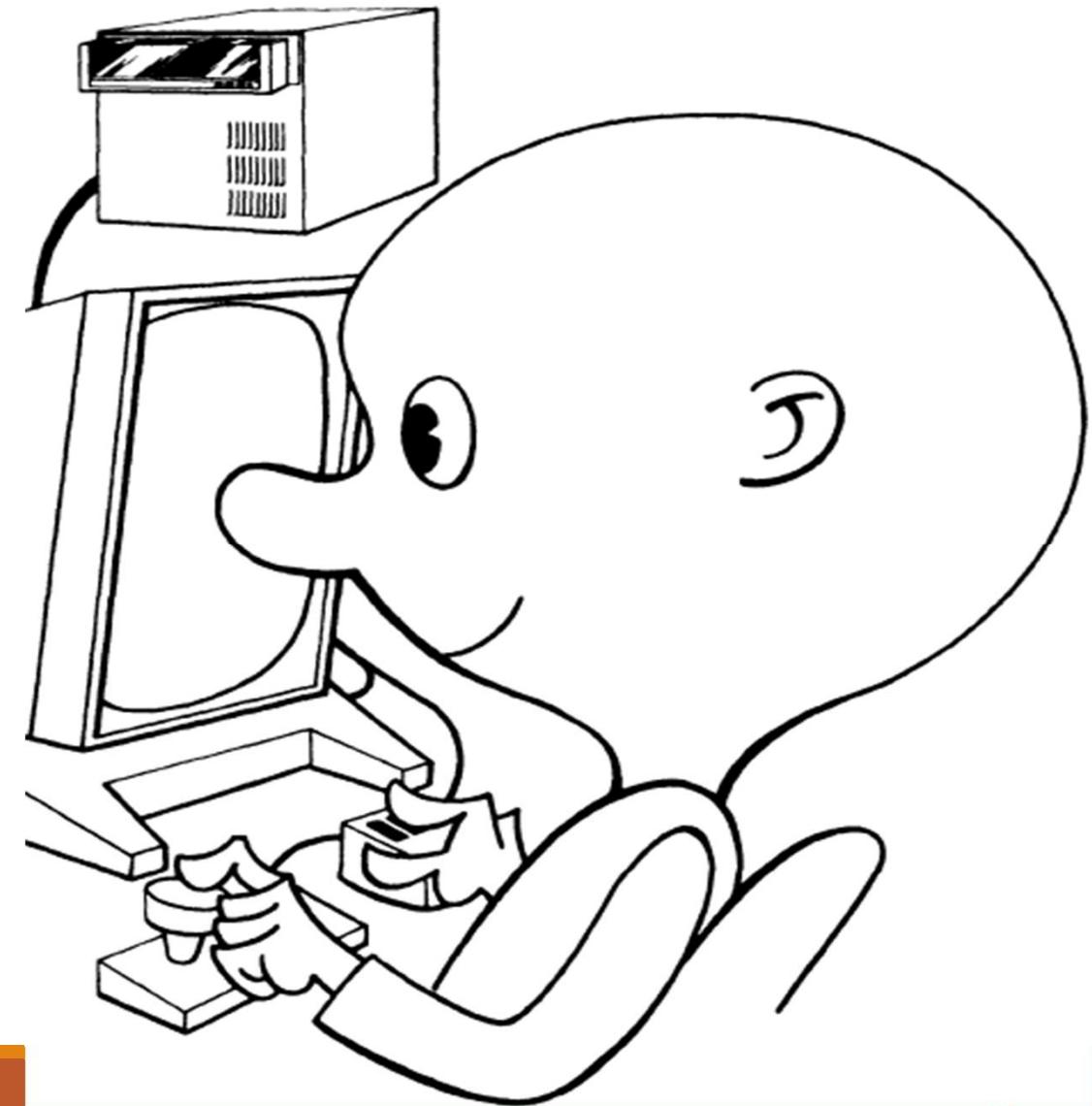
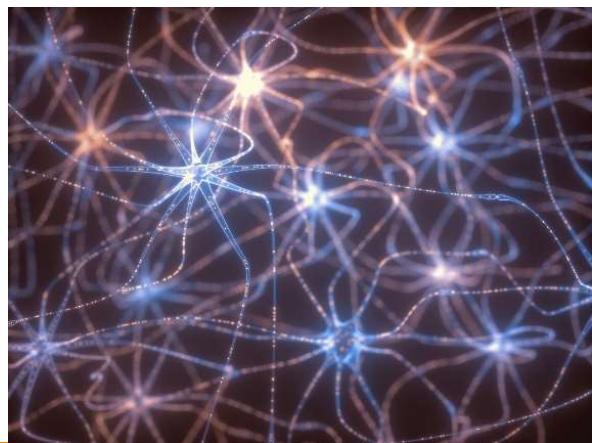
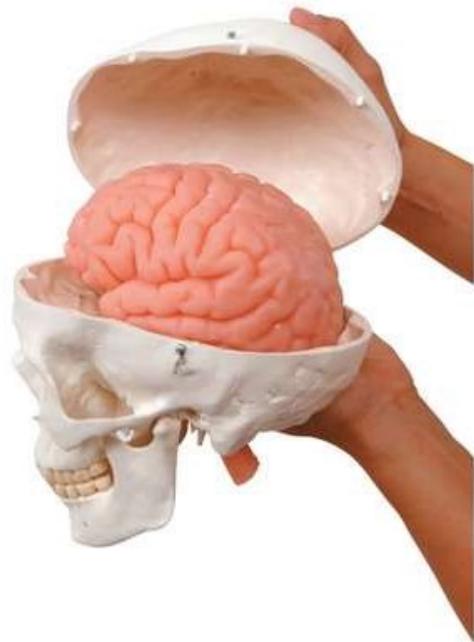
Prerequisite for Assignment-3 

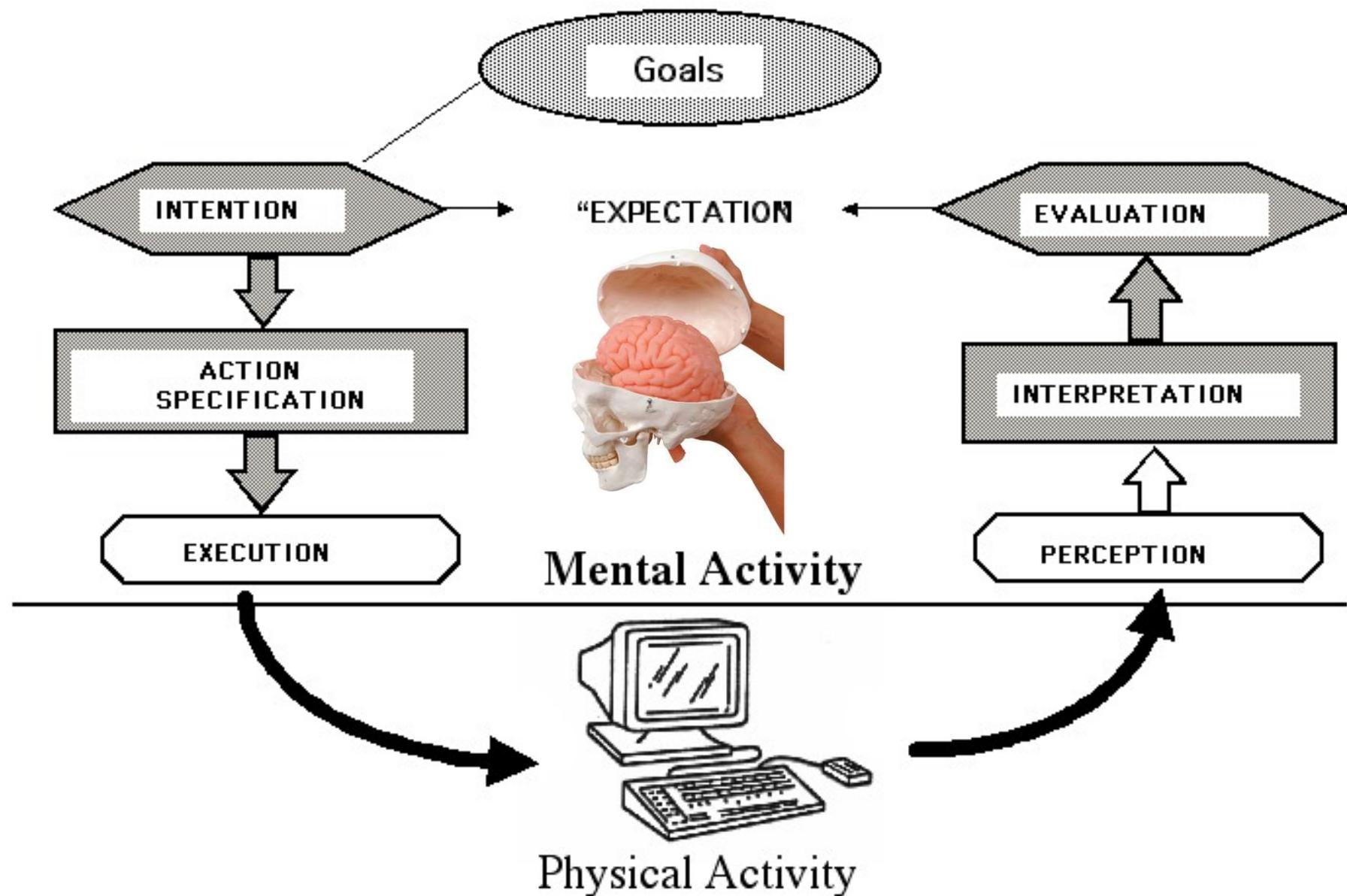
In order to submit Assignment-3, first you have to make this assignment. Simply, install Cogtool software to your computer, make sure it works and submit screenshot of it. The grading is PASS/FAIL. If you have difficulty to install please contact with course assistant. Details of the assignment is in the file.

Four Principle components of an HCI System



Psychology of HCI



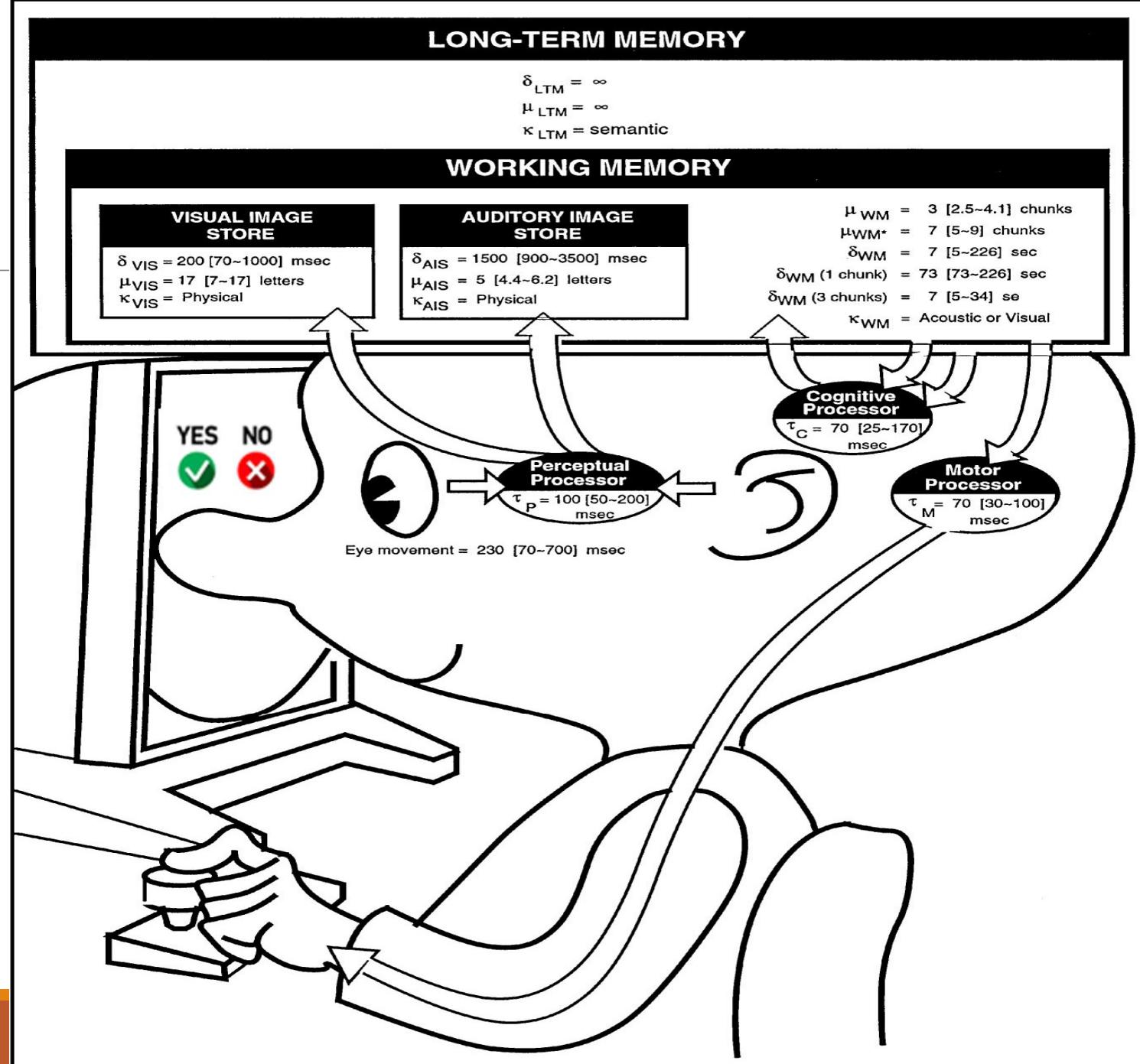


Seven stages of user activities involved in task performance
Don Norman *The Design of Everyday Things*.

The Model Human Processor

The Psychology
of
Human-Computer
Interaction

STUART K. CARD
THOMAS P. MORAN
ALLEN NEWELL



LONG-TERM MEMORY

$$\delta_{LTM} = \infty$$

$$\mu_{LTM} = \infty$$

κ_{LTM} = semantic

WORKING MEMORY

VISUAL IMAGE STORE

$\delta_{VIS} = 200$ [70~1000] msec
 $\mu_{VIS} = 17$ [7~17] letters
 κ_{VIS} = Physical

AUDITORY IMAGE STORE

$\delta_{AIS} = 1500$ [900~3500] msec
 $\mu_{AIS} = 5$ [4.4~6.2] letters
 κ_{AIS} = Physical

$$\mu_{WM} = 3$$
 [2.5~4.1] chunks

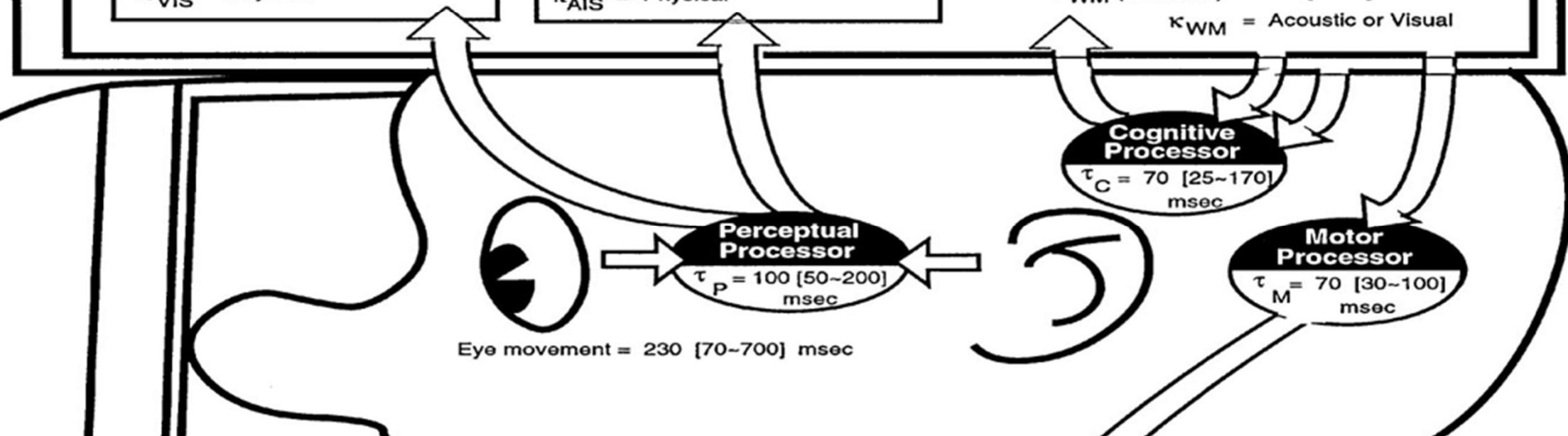
$$\mu_{WM^*} = 7$$
 [5~9] chunks

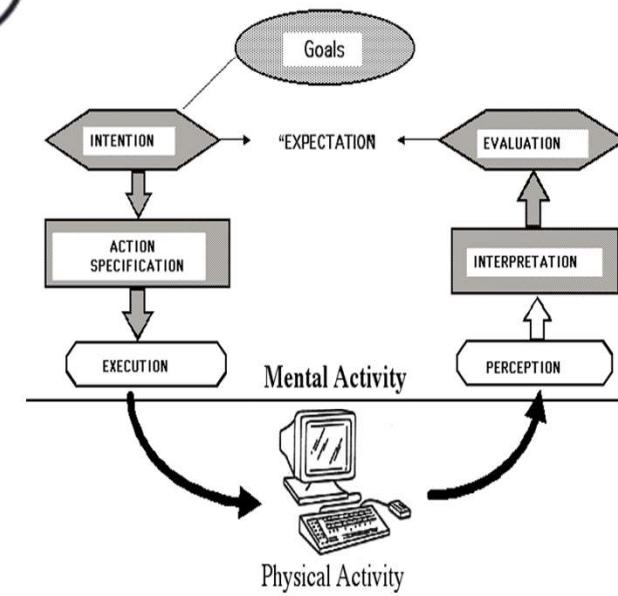
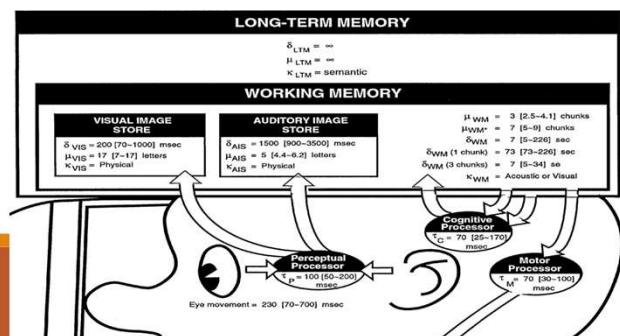
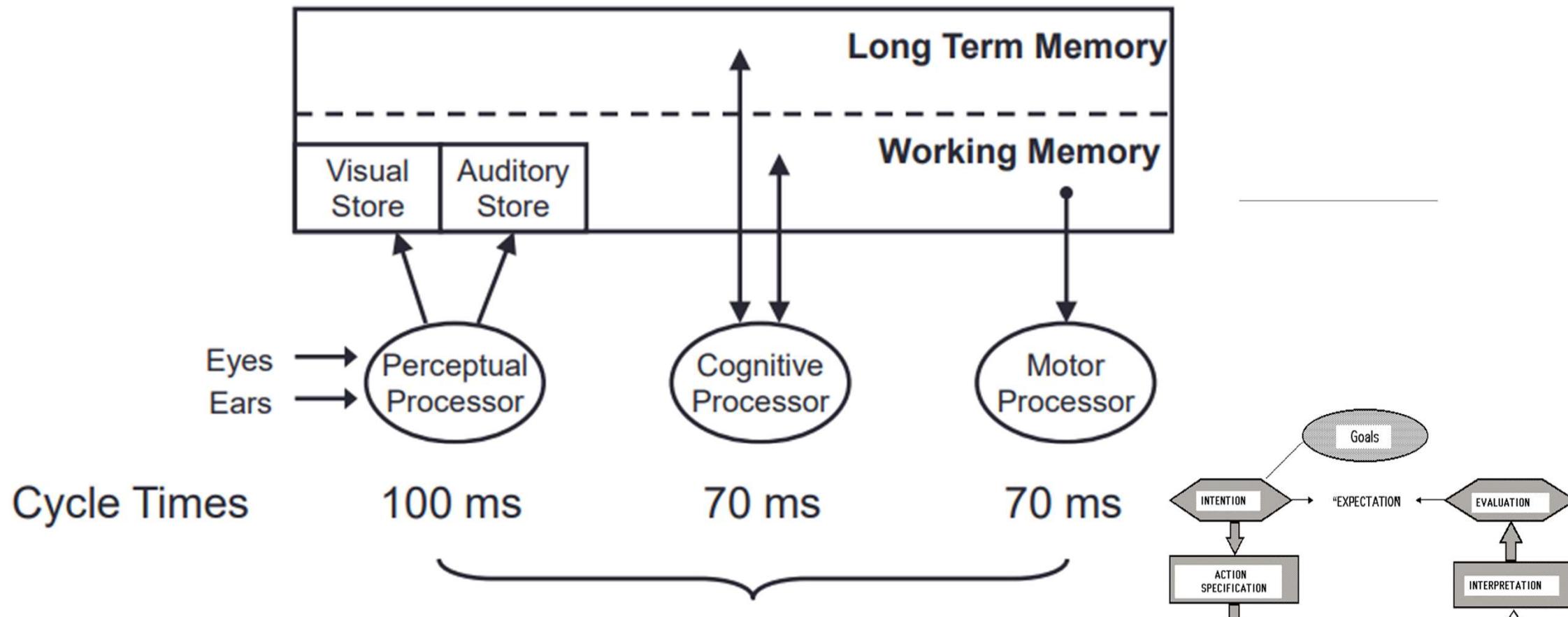
$$\delta_{WM} = 7$$
 [5~226] sec

$$\delta_{WM}$$
 (1 chunk) = 73 [73~226] sec

$$\delta_{WM}$$
 (3 chunks) = 7 [5~34] sec

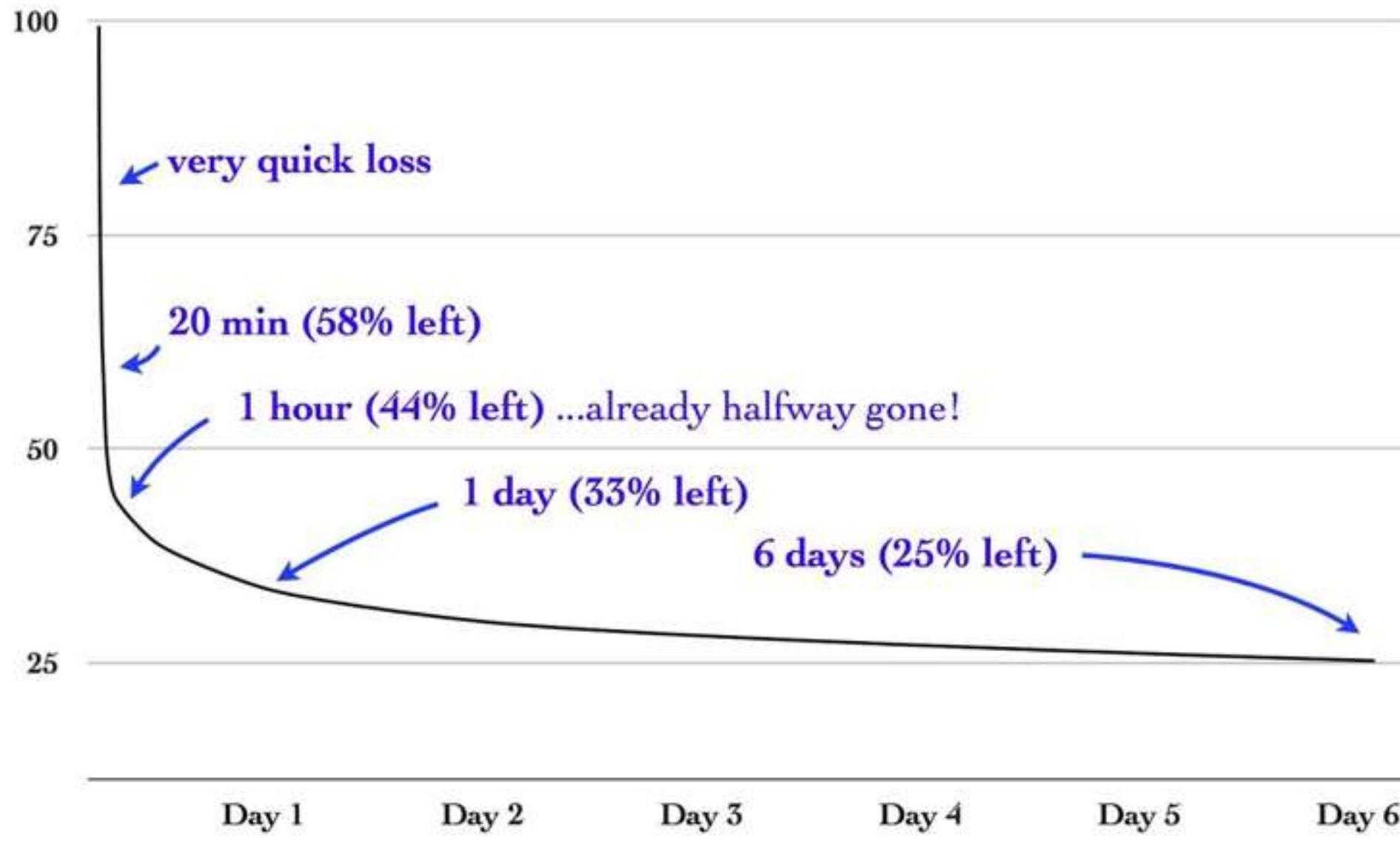
κ_{WM} = Acoustic or Visual





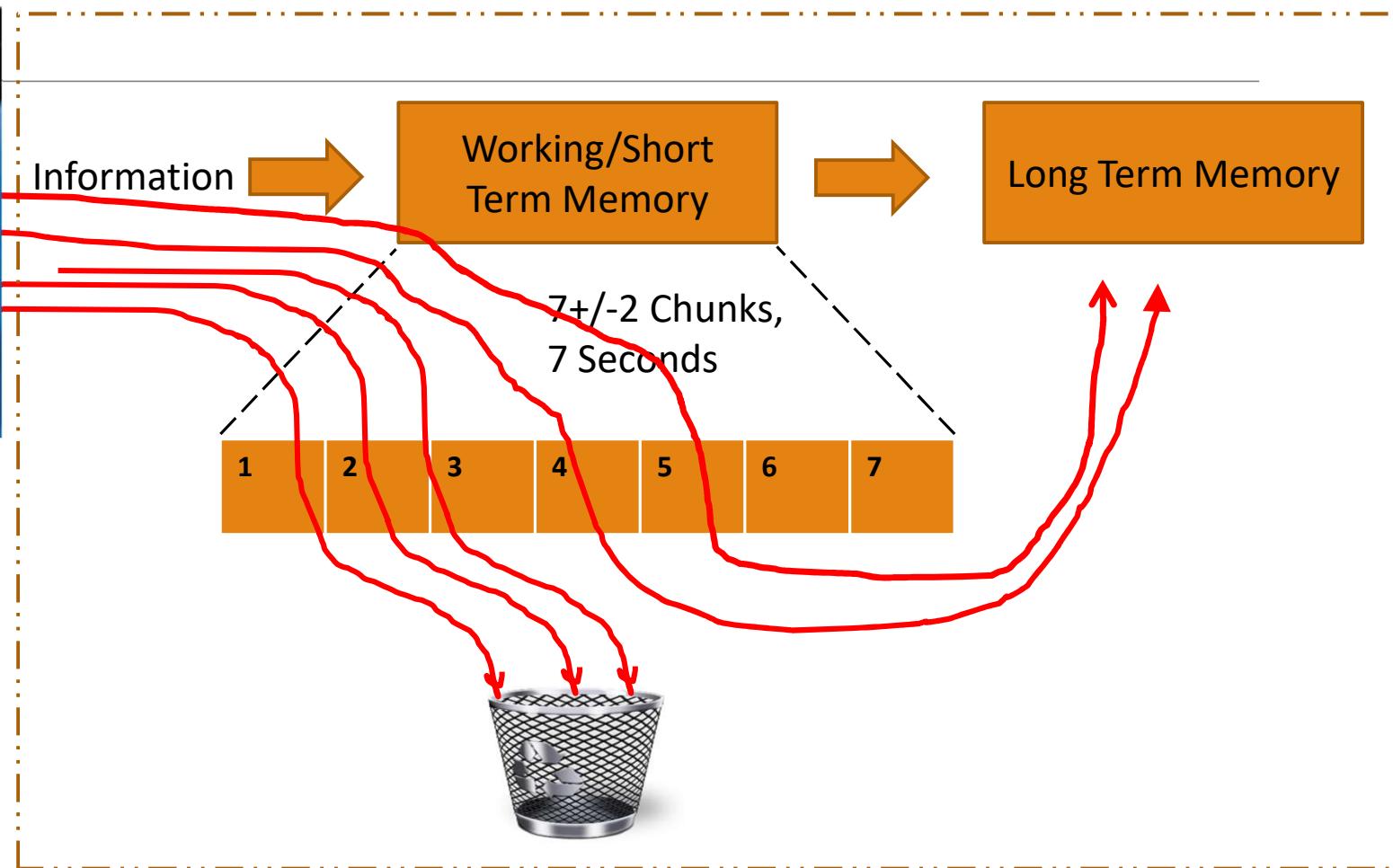
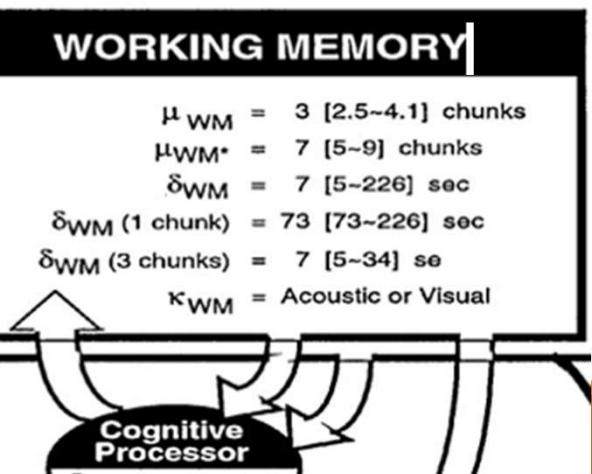
WM and Ebbinghaus's Forgetting Curve

(Names)



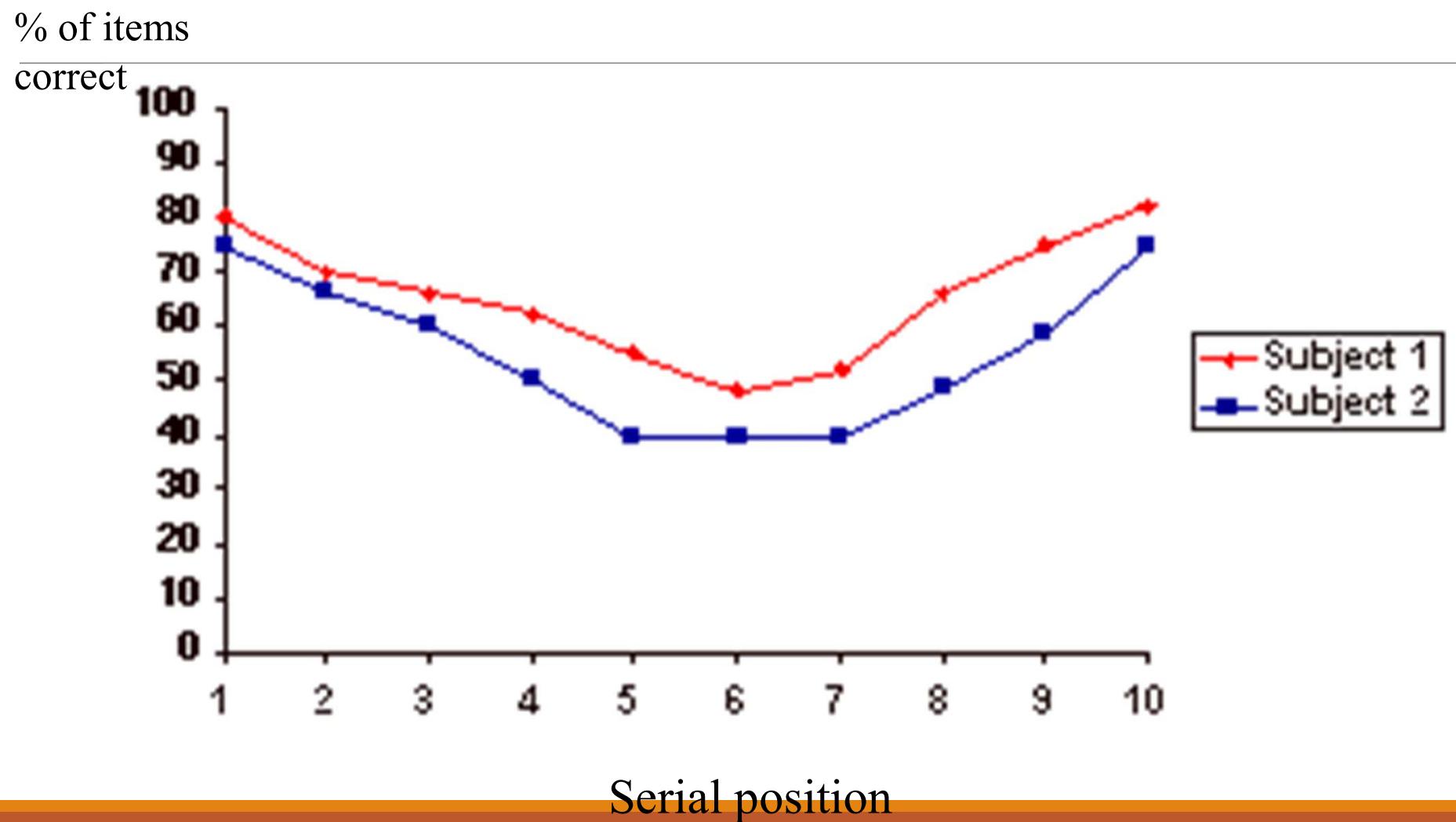
Last Tuesday, I showed you a
number at the beginning of the
class (4th slide). Do you
remember it?

WM, LTM, Chunking, Forgetting

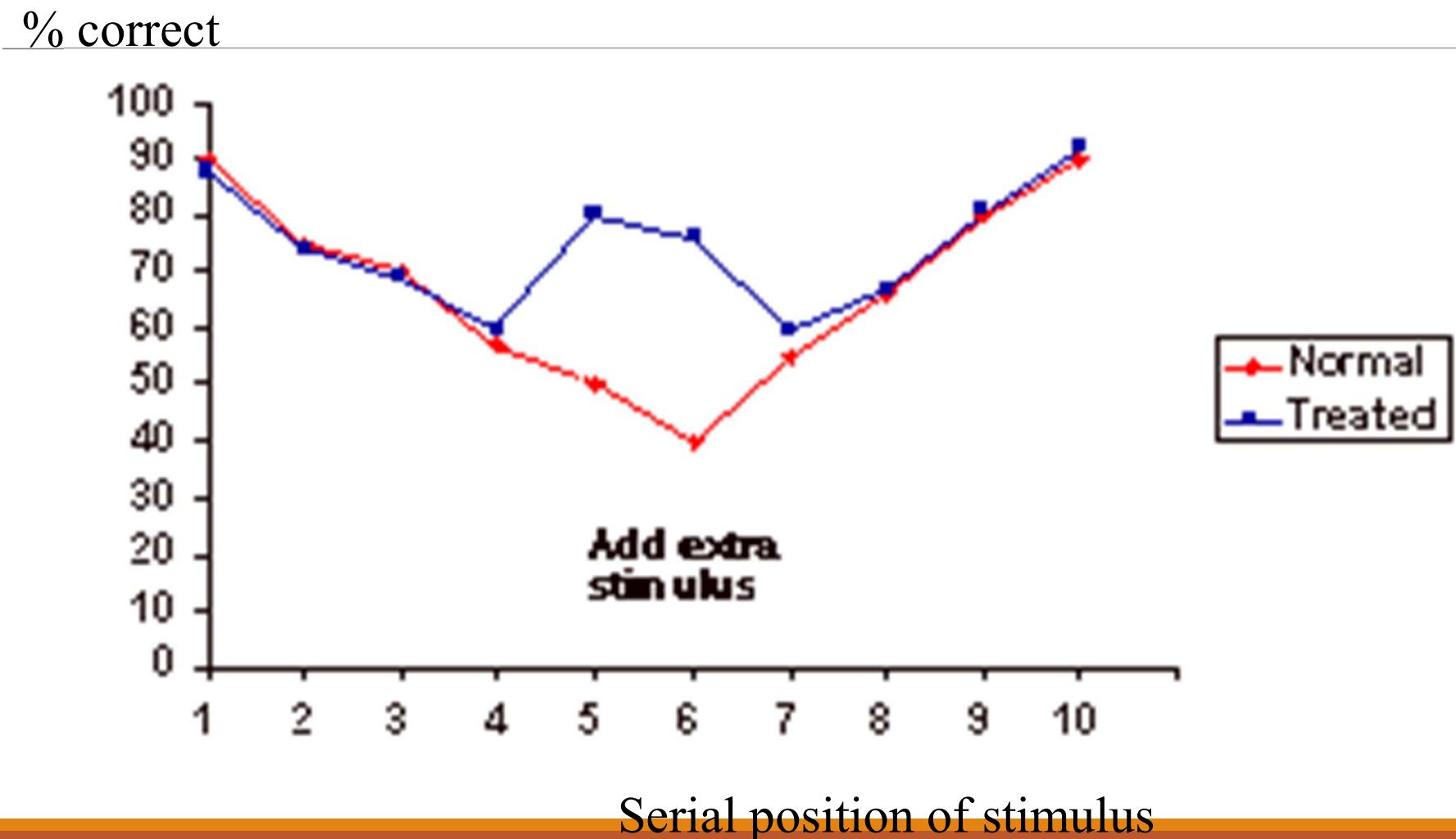


Miller, G. A. (1956). "The magical number seven, plus or minus two: Some limits on our capacity for processing information". *Psychological Review*. 63 (2): 81–97

Primacy and Recency effects

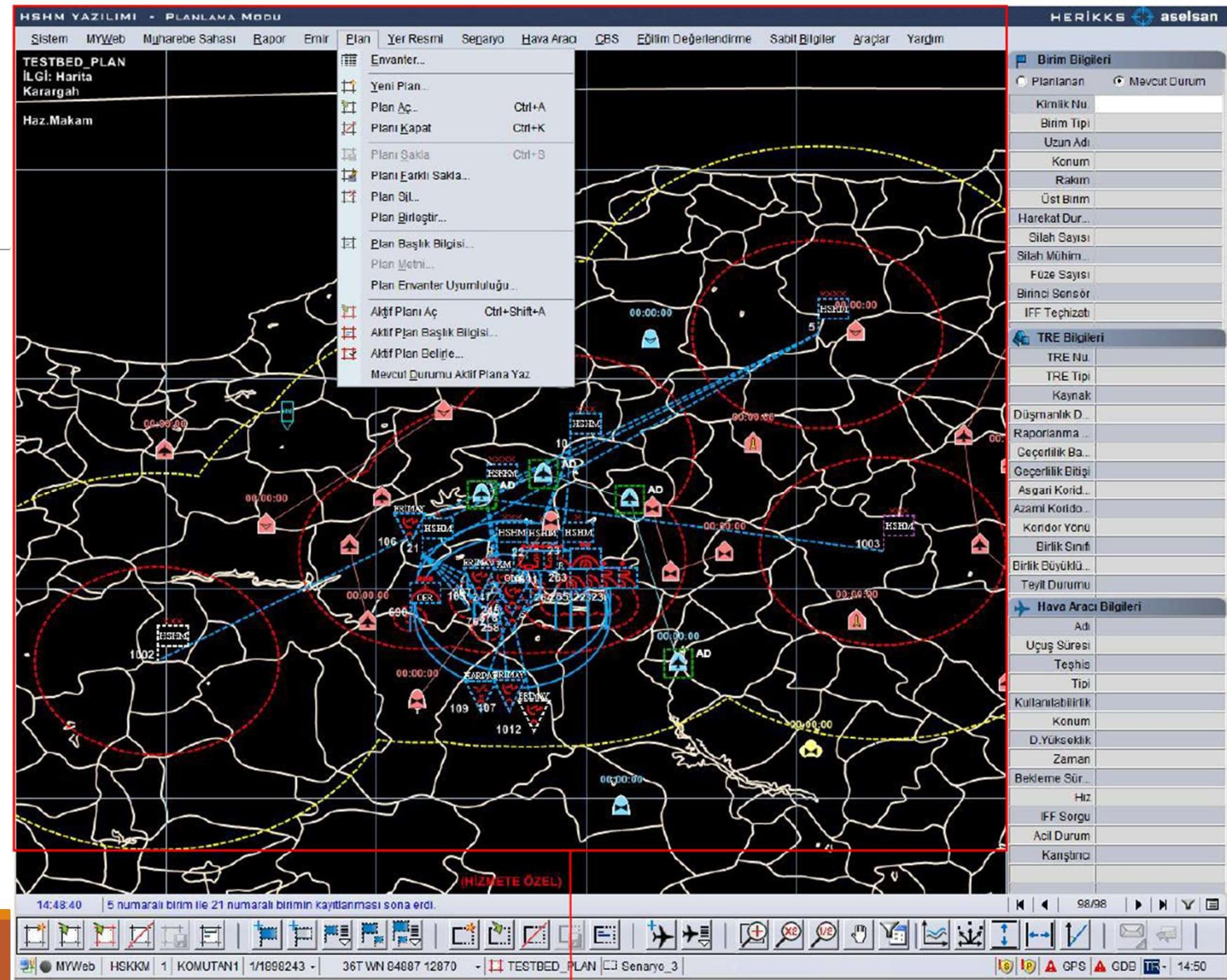


Added cues improve recall



In Real Life?

- Aselsan
 - HERIKKS
 - Air Defense
Command
Control
Software



The value of chunking for recall

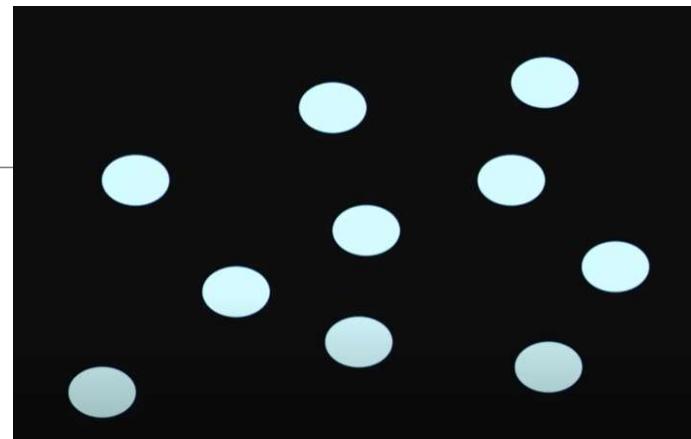
- SUNIBMMAC
- 2164839546
- Chunks must be meaningful for you

- Performance difference factor is 5

***Rate at which an item can be matched
against Working Memory:***

Digits	33 [27~39] msec/item	Cavanaugh (1972)
Colors	38 msec/item	Cavanaugh (1972)
Letters	40 [24~65] msec/item	Cavanaugh (1972)
Words	47 [36~52] msec/item	Cavanaugh (1972)
Geometrical shapes	50 msec/item	Cavanaugh (1972)
Random forms	68 [42~93] msec/item	Cavanaugh (1972)
Nonsense syllables	73 msec/item	Cavanaugh (1972)

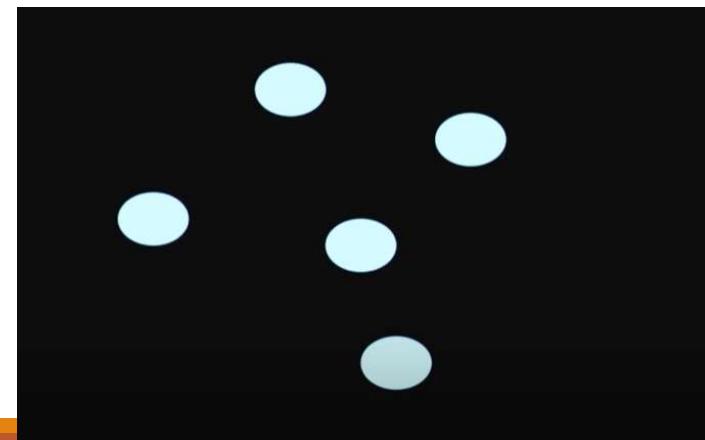
Range = 27~93 msec/item



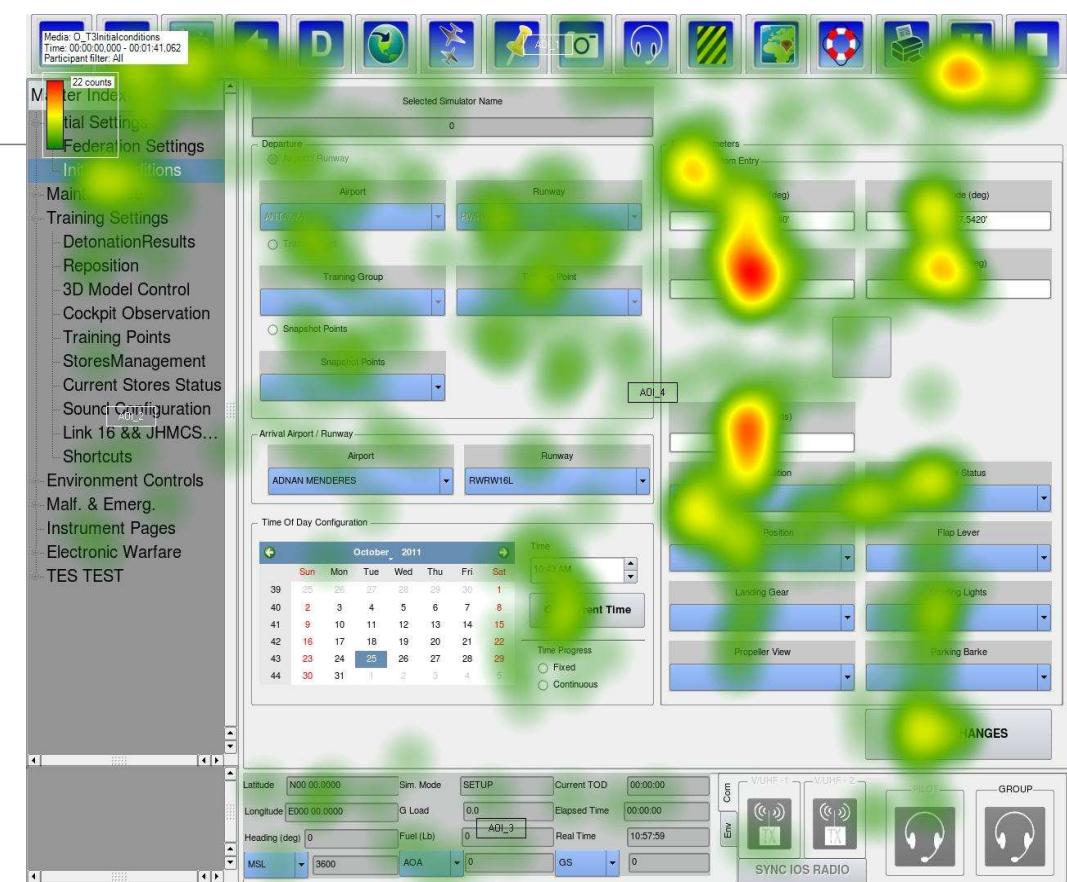
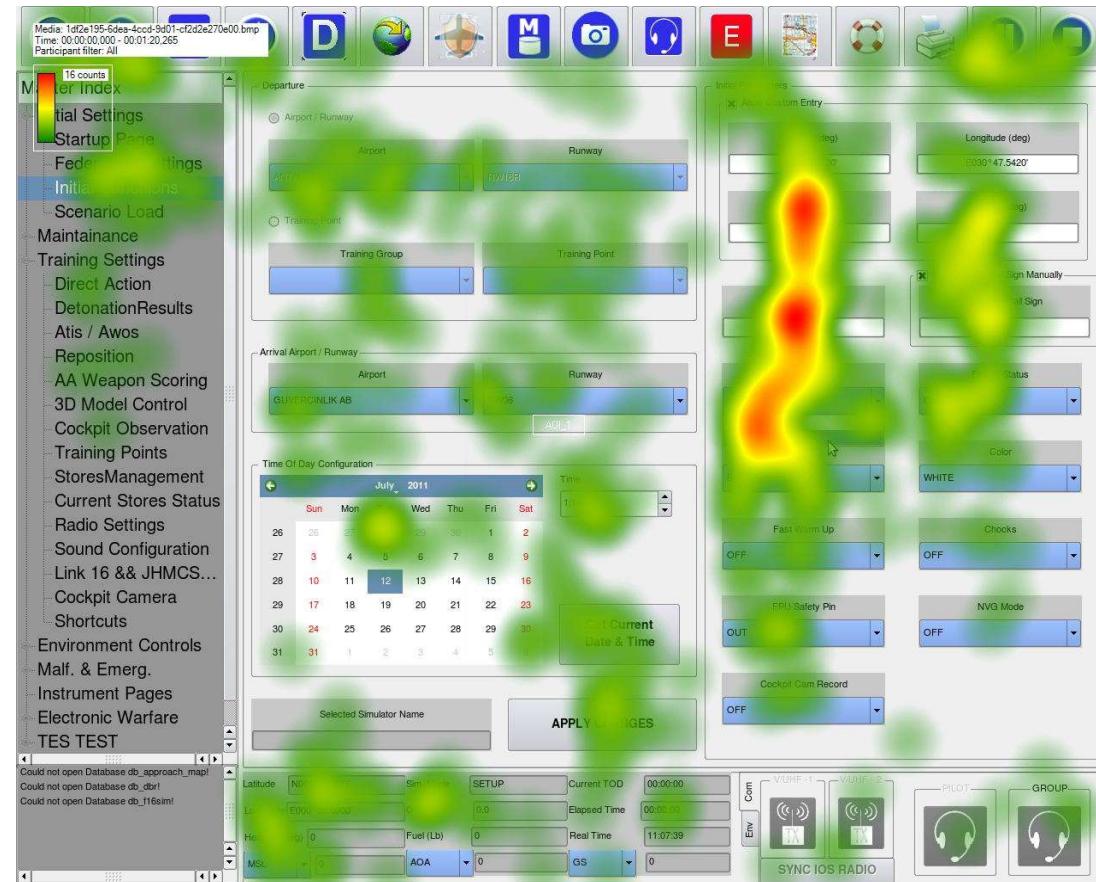
***Rate at which four or fewer objects
can be counted:***

Dot patterns	46 msec/item	Chi & Klahr (1975)
3-D shapes	94 [40~172] msec/item	Akin and Chase (1978)

Range = 40~172 msec/item



Havelsan Flight Simulator Project



- Task Completion (before): 124,6

- Task Completion (after): 55,4

How to use in Software Engineering Projects?

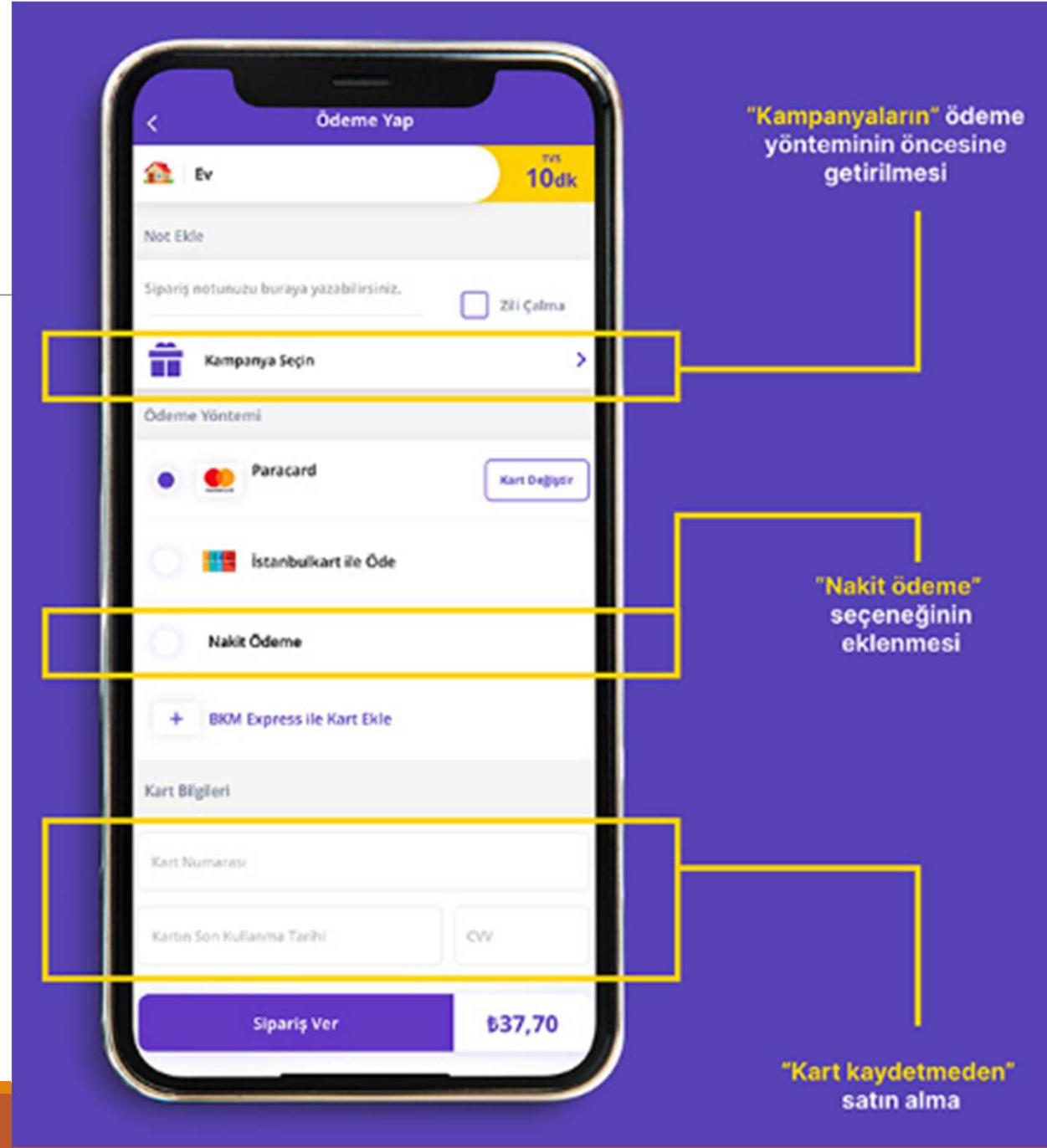
- We know all cognitive parameters
- E.g. Getir project
- <https://www.behance.net/gallery/134533111/Getir-UXUI-Case-Study>

Name	Action	Time (msec)
K	Enter a keystroke	230
M	Point with the mouse	1500
Hm	Move hands to mouse	360
P	Perceive	100
R	Retrieve from memory	1200
Ex	Execute a mental step	70
Ch	Choose among methods	1250

At the very early stage of the project – Low Fidelity Prototype Evaluation



Final stage of the project – Pre Release Evaluation



Deadliest Problem and Cognitive Load

Democracy
Docket

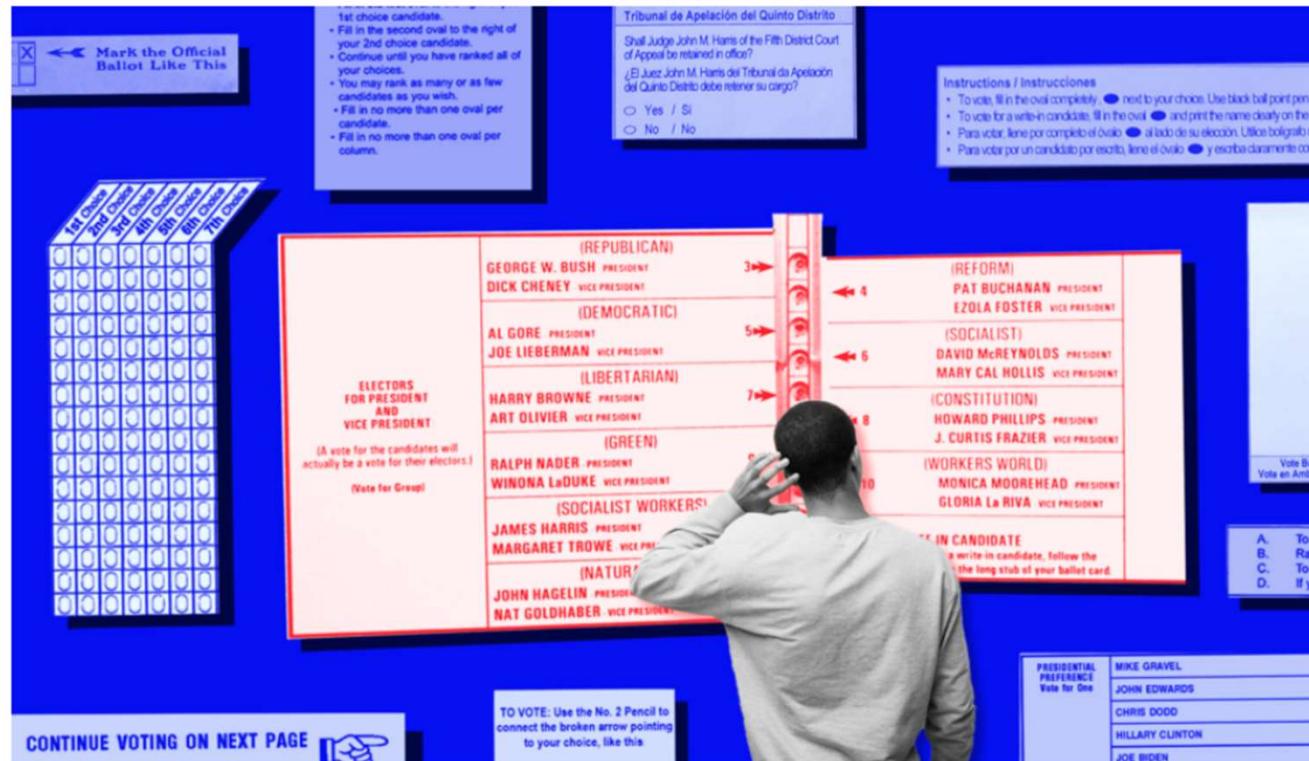
CASES ANALYSIS OPINION NEWS



ANALYSIS | FROM OUR DESK | VOTING

How Ballot Design Impacts Election Results

By Caroline Sullivan | May 19, 2022



<https://www.theguardian.com/us-news/2019/nov/19/bad-ballot-design-2020-democracy-america>

OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

(REPUBLICAN)

GEORGE W. BUSH - PRESIDENT

DICK CHENEY - VICE PRESIDENT

(DEMOCRATIC)

AL GORE - PRESIDENT

JOE LIEBERMAN - VICE PRESIDENT

(LIBERTARIAN)

HARRY BROWNE - PRESIDENT

ART OLIVIER - VICE PRESIDENT

(GREEN)

RALPH NADER - PRESIDENT

WINONA LaDUKE - VICE PRESIDENT

(SOCIALIST WORKERS)

JAMES HARRIS - PRESIDENT

MARGARET TROWE - VICE PRESIDENT

(NATURAL LAW)

JOHN HAGELIN - PRESIDENT

NAT GOLDHABER - VICE PRESIDENT

(REFORM)

PAT BUCHANAN - PRESIDENT

EZOLA FOSTER - VICE PRESIDENT

(SOCIALIST)

DAVID McREYNOLDS - PRESIDENT

MARY CAL HOLLIS - VICE PRESIDENT

(CONSTITUTION)

HOWARD PHILLIPS - PRESIDENT

J. CURTIS FRAZIER - VICE PRESIDENT

(WORKERS WORLD)

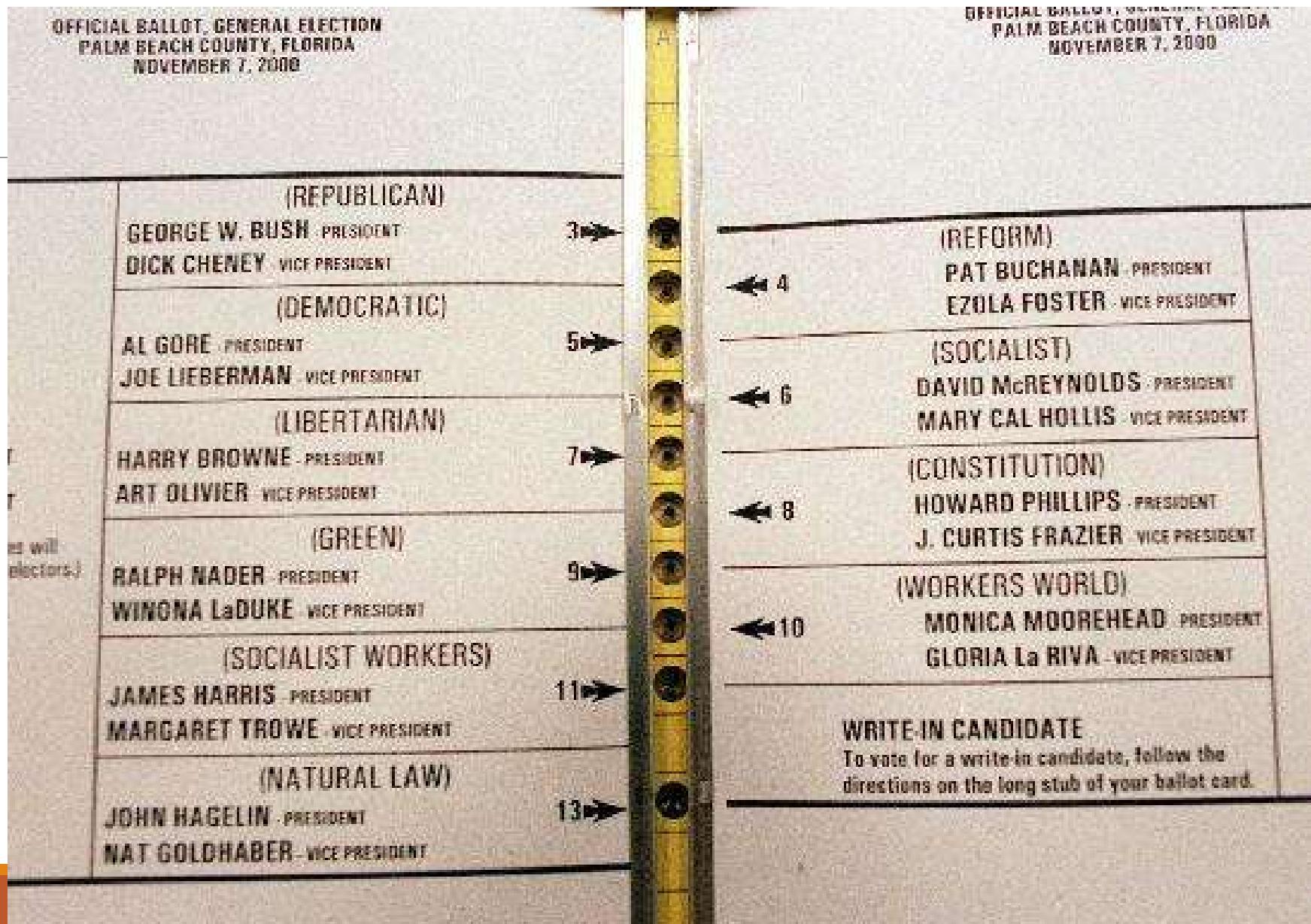
MONICA MOOREHEAD - PRESIDENT

GLORIA La RIVA - VICE PRESIDENT

WRITE-IN CANDIDATE

To vote for a write-in candidate, follow the directions on the long stub of your ballot card.

US elections - Palm Beach County



1
OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

ELECTORS
FOR PRESIDENT
AND
VICE PRESIDENT

(A vote for the candidates will
actually be a vote for their electors.)

(Vote for Group)

(REPUBLICAN)

GEORGE W. BUSH - PRESIDENT

DICK CHENEY - VICE PRESIDENT

3 →

(DEMOCRATIC)

AL GORE - PRESIDENT

JOE LIEBERMAN

5 →

**Where people
voted for Al Gore**

HARRY BROWN
ART OLIVIER - VICE PRESIDENT

(GREEN)

RALPH NADER - PRESIDENT

WINONA LaDUKE - VICE PRESIDENT

9 →

(SOCIALIST WORKERS)

JAMES HARRIS - PRESIDENT

MARGARET TROWE - VICE PRESIDENT

11 →

(NATURAL LAW)

JOHN HAGELIN - PRESIDENT

NAT GOLDHABER - VICE PRESIDENT

13 →

A

OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

(REFORM)
PAT BUCHANAN - PRESIDENT

**Where people
were supposed to
vote for Al Gore**

HOWARD PHILLIPS - PRESIDENT
J. CURTIS FRAZIER - VICE PRESIDENT

(WORKERS WORLD)

MONICA MOOREHEAD - PRESIDENT

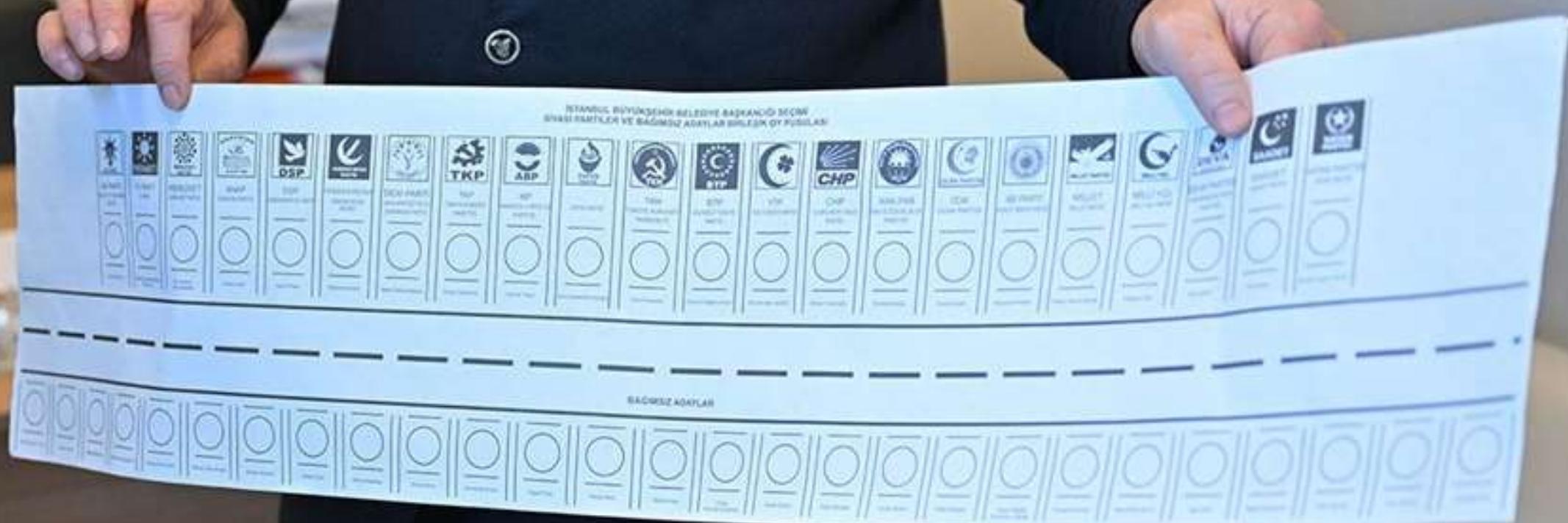
GLORIA La RIVA - VICE PRESIDENT

WRITE-IN CANDIDATE

To vote for a write-in candidate, follow the
directions on the long stub of your ballot card.

Ballot problems

- Al Gore and Joe Lieberman are the second names on the ballot, but the third hole to punch
- Alignment of the text in each column
- The layout of double pages with punch holes in between was novel & unfamiliar. Ballots in previous elections had used only a single column with punch holes on the right.
- Confusing arrows and numbers
- Stress induced by the voting process
- “It was so hard to tell who and what you were voting for. I couldn’t figure it out, and I have a doctorate,” voter Eileen Klasfeld said.
- <http://danbricklin.com/log/ballotusability.htm>
- <http://www.humanfactors.com/library/election.asp>



Your upcoming assignment

- Evaluation and comparison of two interfaces by Cognitive modeling

<https://www.cogtool.org/>

CogTool — Predictive human performance modeling for UI design

[Home](#) [Blog](#) [Tutorial](#) [Videos](#) [Publications](#) [FAQs](#) [Forums](#) 



CogTool is a general purpose UI prototyping tool with a difference – it automatically evaluates your design with a predictive human performance model (a “cognitive crash dummy”).

[Download for Windows](#)

[Download for macOS](#)

General 



URL

Assignment-5 and 6 groups - Term Project Groups and Topic Form 



ASSIGNMENT

Prerequisite for Assignment-3 

In order to submit Assignment-3, first you have to make this assignment. Simply, install Cogtool software to your computer, make sure it works and submit screenshot of it. The grading is PASS/FAIL. If you have difficulty to install please contact with course assistant. Details of the assignment is in the file.

Week-6: Beyond usability engineering Understanding the user (part 2) Perception



FILE

Visual Interface Design and psychology Ch12 - Designing User Experience-Benyon



FILE

Memory Attention Ch21 - Designing User Experience-Benyon



Usability always a challenge even in the history

- First support person's story ☺



One last thing
